R E P O R T R E S U M E S

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INFORMATION, STANDARDS, AND SPECIFICATIONS FOR EQUIPMENT, MATERIALS, AND MINOR REMODELING FOR MODERN FOREIGN LANGUAGES (REVISED).

ILLINOIS STATE OFF. SUPT. PUB. INSTR., SPRINGFIELD

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THE INFORMATION INCLUDED IN THIS VERY DETAILED DOCUMENT IS INTENDED FOR TEACHERS AND ADMINISTRATORS PLANNING AND IMPLEMENTING PROGRAMS TO IMPROVE FOREIGN LANGUAGE INSTRUCTION. THE SPECIFICATIONS PRESENTED ARE MINIMUM, BUT THEY MEET THE REQUIREMENTS UNDER THE PROVISIONS OF TITLE III, NDEA. THE FIRST PART OUTLINES PROCEDURES FOR THE SELECTION AND PURCHASE OF EQUIPMENT. A SECTION ON LANGUAGE TEACHING EQUIPMENT DESCRIBES THE PURPOSES AND TYPES, INCLUDING AUDIO-ACTIVE EQUIPMENT AND CENTRAL CONTROL INSTALLATIONS, AND DISCUSSES THE SIZE, SCHEDULING, LAYOUT, FACILITIES, AND OTHER CONSIDERATIONS FOR A LANGUAGE LABORATORY. IN THE MAJOR SECTION, DETAILS ARE PROVIDED ON SUCH TOPICS AS INSTALLATION AND WIRING SPECIFICATIONS, EQUIPMENT SPECIFICATIONS, COMPONENTS AND INDIVIDUAL MACHINES (INCLUDING AMPLIFIERS, DISCS, EARPHONES, MICROPHONES, TAPE RECORDERS, AND ACCESSORIES), AND SEVERAL TYPES OF VISUAL EQUIPMENT. A BRIEF SECTION OUTLINES LANGUAGE TEACHING MATERIALS. (AF)

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STATE OF ILLINOIS
OFFICE OF THE SUPERINTENDENT OF PUBLIC INSTRUCTION
RAY PAGE, SUPERINTENDENT
SPRINGFIELD

INFORMATION, STANDARDS, AND SPECIFICATIONS FOR EQUIPMENT, MATERIALS, AND MINOR REMODELING FOR MODERN FOREIGN LANGUAGES
(Revised)

FL 000 131

EFFECTIVE JULY 1, 1965

The information, standards, and specifications included here are designed to help in planning and implementing programs for the improvement of instruction in Modern Foreign Languages. The specifications which are presented are minimum. In all cases, each item must be selected on the basis of need in the local program.

To be approved for acquisition under the provisions of Title III, NDEA, all equipment, materials, and minor remodeling must meet the "required" specifications stated here.

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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The Office of the Superintendent of Public Instruction wishes to render constant and efficient service to the schools of Illinois. In our efforts to provide this kind of service, we find it most important to become aware of the needed changes that must be made in the type of service offered by our staff. Progress inevitably represents change: Research studies by the Office of the Superintendent of Public Instruction have made us well aware of the great progress that has been made in the technical equipment that can be used to excellent advantage by the classroom teacher to promote quality education.

To insure high standards and quality in the technical equipment being used by the classroom teacher, we have given immediate attention to the specifications being used as a guide for the purchase of equipment. School administrators, equipment manufacturers, and classroom teachers throughout the State were most helpful in making us aware of needed revisions incorporated in this manual. We are grateful for their conscientious assistance.

Ray Page

TITLE III
AMENDMENTS TO FOREIGN LANGUAGE SPECIFICATIONS
ILLINOIS STATE PLAN
January 1, 1964
(AMENDED)

(EFFECTIVE - JULY 1, 1965)

The following list of devices to be used by teachers primarily for the preparation of foreign language materials may be approved for reimbursement with Title III funds.

Projection stands and tables if purchased with a projector
Videotape recorder (non-broadcast type)
Dry mounting presses
Laminating machines
Special keyboard typewriters
Lettering devices
Tape duplicating equipment
Transparency makers
Transparency production kits
Materials needed for making of transparencies
Processed Microfilm
Flat pictures and supplementary filmstrip
Reference books and pamphlets with English text for teacher use only
Professional journals for teacher use only (not concomitant with professional dues)
Curriculum bulletins for teacher use only
Supplementary teaching guides for teacher use only
Materials for production of nonconsumable and/or visual materials
One copy of test materials for basic text for teacher use only

N. B. : "For teacher use only" indicates that one item will be approved per learning center.

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ACQUISITION OF EQUIPMENT AND MATERIALS

GENERAL CONSIDERATIONS:

Equipment, including complete foreign language laboratories, and materials are essentially teaching tools and therefore should be integrated into an educationally sound program of instruction. In the professional staff's planning of the program, the actual selection of needed equipment and materials should be the last step. The proper sequence of planning is: definition and statement of instructional objectives; statement of methods, techniques and practices to reach objectives; and selection of equipment and materials needed to implement methods, techniques and practices.

The type, kind, and quantity of equipment and materials needed should be determined on the basis of the instructional program. The current market provides sufficient diversification of equipment and materials to meet any needs. A number of suppliers of equipment is prepared to alter basic equipment to provide the kind of functions specified by the school.

All equipment and materials, whether used alone or in a system, must meet minimum standards in order to perform satisfactorily for the intended purpose. In order to be approved for acquisition under the provisions of Title III, NDEA, State of Illinois, all equipment and materials must meet the "required" specifications.

PROCEDURES FOR SELECTION AND PURCHASE OF EQUIPMENT:

A. Selection, by the professional staff, of the type of facilities and equipment needed:

1. General recommendations:
   a. Determine general needs in relation to planned instructional program.
   b. Determine the desired functions to be performed by the facilities.
   c. Write for, and read, materials about language teaching equipment, both non-commercial and commercial.
   d. Visit various existing installations to determine functions and type of equipment.
   e. Seek orientation and advice from the audio-visual director, radio or TV station engineer, or other expert.
2. Equipment considerations:
   a. Type of facilities should be defined: listening, audio-active, audio-active-record, or a combination of these.
   b. Amount of equipment needed to implement objectives and methods should be determined.

   For details on the characteristics of equipment, see specifications for each item.

3. Evaluation of equipment:
   a. Subjective evaluation: Several language teachers should evaluate the equipment for accuracy of reproduction of foreign speech sounds--are s and sh clearly distinguishable; are f and th? Record and play back the English sequence: sin, shin, fin, thin, in various orders. The uninformed listener should be able to differentiate clearly. Particular care should be taken to determine the perfect intelligibility of all vowel and consonant sounds, remembering that a foreign language requires higher fidelity to insure intelligibility and sound discrimination than does the mother tongue.
   b. Technical evaluation: Ordinarily, this should be done by a specialist. When such a specialist is not available at the school an audio-visual expert, sound or electronic engineer, or other expert should make exacting tests to determine whether the equipment meets the specifications and can perform the desired functions.
4. Space and facilities:
   a. Determine the amount and kind of space needed for the type of installation selected.
   b. Determine whether special treatment or remodeling of the space is necessary.
   c. Determine the type and kind of additional space or facilities which are needed in conjunction with the basic installation.
   d. Determine the potential for additions to, or expansion of, the basic installation.
5. Service: determine servicing facilities in your locality for:
   a. Minor maintenance.
   b. Major repair.
   c. Related items or installations.

B. Preparation of the proposal by the professional staff for submission to the administrative staff:
   1. Write detailed statement on functions to be performed by the equipment.
   2. Write detailed statement of needs in terms of quantity of equipment.
   3. Report on the findings on specific equipment.
   4. Prepare a statement on needed space and facilities.
   5. Prepare a statement on anticipated cost.

C. Writing of the specifications by the administrative staff:
   1. Specifications should be prepared that are exacting but reasonable.
   2. The specifications should be written in terms of the functions to be performed by the equipment.
   3. Specific components should be listed.
   4. Special services required by the bidder should be detailed.

D. Soliciting bids:
It is highly recommended that competitive bids be solicited and that products be tested under conditions of planned use. It is frequently necessary to evaluate each bid in detail to insure that all items meet minimum specifications and that the required functions can actually be performed by the equipment offered by the bidder. Consequently, detailed bids, including descriptive specifications, engineering and installation data, and description and detail on furnishings should be requested. As a result of seeing actual bids, it may be advantageous to the school to alter its original proposal in order to select equipment more suited to its needs. The school should reserve the right to accept or reject any bid or part thereof.

E. Contents of the Invitation to Bid:
1. General description of items and installations:
   a. Detailed functions to be performed, including alternates clearly stated.
   b. List of items required to perform the functions.
   c. Quantities desired.
2. Detailed specifications and performance of equipment:
   a. Overall system specifications and performance: refer to State specifications.
   b. Equipment specifications: refer to State specifications.
   c. General specifications: refer to State specifications.
   d. Special requirements needed for the particular situation.
3. Additional requirements:
   a. Provide for demonstration and inspection of a stock model or a modification of a stock model no later than (date specified by school) and before the opening of the bids.
   b. Guarantee that identical machines will be delivered in the event of award.
   c. Agreement to allow thorough inspection of the equipment by any expert chosen by the school.
   d. Agreement to allow subjective appraisal and approval by language teachers and other school authorities.
   e. Provisions for standard indemnification against patent infringement.
   f. Following inspection, the submission of a revised model not later than a date specified by the school (date established to be prior to opening of bids).
   g. Submission of a complete list of schools using identical equipment (the teacher or director may wish to consult these schools for further advice).
   h. Submission of details concerning the engineering of special features required above.
4. Bidder's Services:
   a. Complete installation of equipment according to local code and school requirements, and training of personnel in operation and maintenance.
   b. Submission of complete and detailed service manuals for all equipment supplied.

c. Statement of policy concerning optional service contract, including services and costs involved.
d. Statement of policy concerning the availability of the bidder for technical consultation and fees for such service.
e. Statement of terms of warranty (normally should include at least one year's service and parts).
f. Manner of submission of bid.
g. Statement of terms of payment.
h. Statement from manufacturer that distributor is a fully authorized agent.
i. Statement by bidder on his ability to supply service (including location of his maintenance facilities).
j. Statement by bidder giving evidence of proper and adequate insurance to cover his personnel and others working under contract to him and relieving the school of all responsibilities.

5. Special requirements:
a. Submission by the bidder of a complete breakdown of costs for each component of the installation, installation charges detailing costs of labor and materials, and any other costs charged to the school.
b. Submission by the bidder of an affidavit certifying that the equipment offered meets the "required" State specifications.

LANGUAGE TEACHING EQUIPMENT

PURPOSES AND TYPES OF LANGUAGE TEACHING EQUIPMENT

The term "language laboratory" can be misleading in that a variety of installations of language teaching equipment is included in the expression. Whether an installation is a language laboratory or not is essentially determined by the use that is made of the equipment. Fundamentally the laboratory is a teaching device through which a carefully planned and integrated program of instruction in the elements of a foreign language is presented. In the initial phase of the instructional program the aim is to acquire and to gain almost automatic control of given speech patterns of the foreign language. This initial learning is not essentially an intellectual process but the development of a skill through imitation, repetition and drill. Intellectual content of the language can later be built on the foundation of this established speech behavior.

The acquisition and control of the speech patterns of the foreign language are achieved through listening to, understanding, and speaking the sounds, rhythms, and intonations of the language. Recognition and interpretation (reading) of printed or transcribed language forms involves additional skills while the transcription of the language (writing) demands other skills. The ultimate objective is the creative use of the skills in the natural and easy use of the speech patterns in meaningful espressions and context.

A language laboratory can help to attain these objectives through efficient direction of student learning of the language and economical use of student time. Learning the language through this medium requires more effort and time on the part of both teachers and students than did the traditional grammar-reading-translation method. Therefore the language laboratory should be designed to utilize effort and time reasonably and effectively.

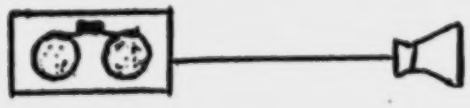
A. General Purposes of Language Teaching Equipment.
The equipment serves to reproduce and record sound faithfully and without distortion or noise so that the foreign language speech patterns may be heard clearly and recognized. The reproduction and recording may be done with a single tape recorder for a single student or with a full laboratory installation for an entire class. For greater versatility in effective use of effort and time, varied or multiple components may provide: (1) simultaneous presentation of different programs adapted to individual needs; (2) simultaneous participation by a given number of students; and (3) simultaneous presentation of a lesson, practice on a lesson, and supervision of activity by the teacher.

B. Types and Purposes of Language Teaching Equipment.
1. Listening equipment or installation.

a. Supplies a foreign language lesson program from a source (tape recorder or record player) to a loudspeaker or a number of individual earphones. These installations can be placed in a portion of the regular classroom, in a small room adjacent to the classroom, in the library, or in another small space which can be easily supervised.

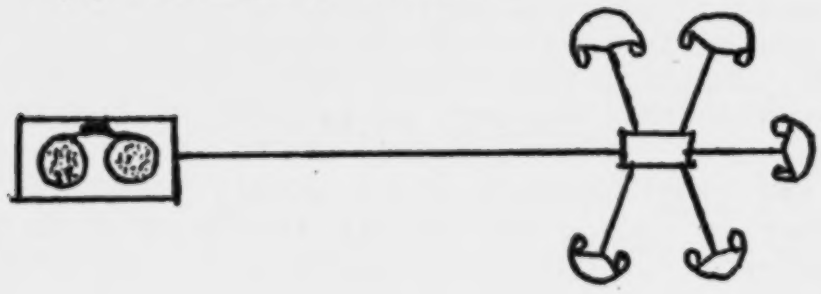
b. May consist of:

(1) One program source connected to a loudspeaker:

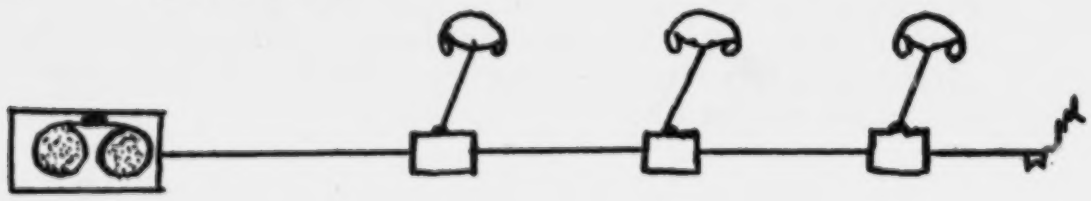


(2) One or more program sources with individual student earphones connected to it by:

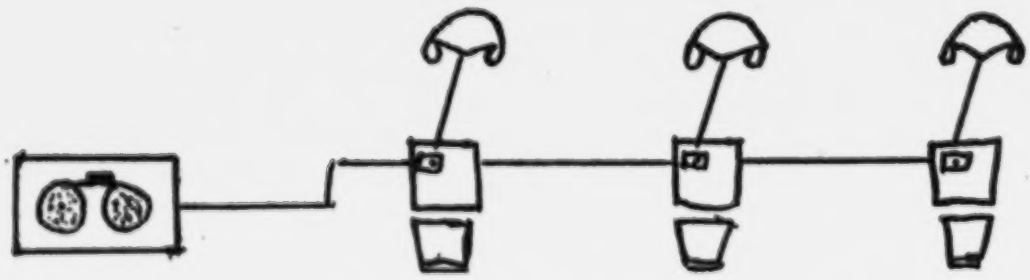
(a) Movable jackboxes.



(b) Wall-mounted audio lines with individual jackboxes.

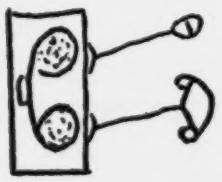


(c) Audio lines to some or all student seats which are equipped with individual jacks.

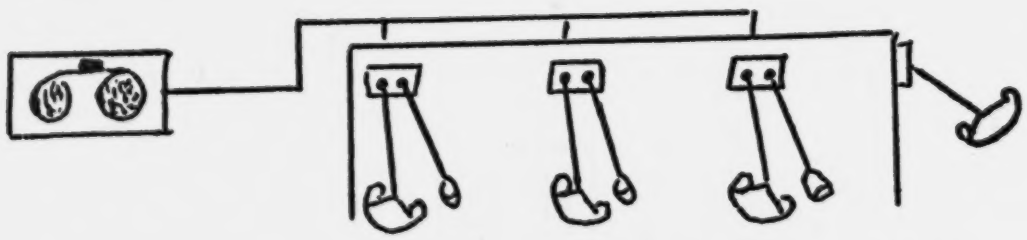


2. Audio-active equipment or installation.
   a. Supplies a program to one or more students through individual earphones. With a microphone and amplifier the student may respond into the microphone and hear his response through his earphones. Similar to the listening equipment, the audio-active equipment can be located in a variety of convenient places.

      For all audio-active installations recording can be arranged by plugging in portable tape recorders at the student positions, provided that AC power outlets have been installed. With a central control, recording can be done there.
   b. May consist of:
      (1) A single program source with a microphone and earphones.

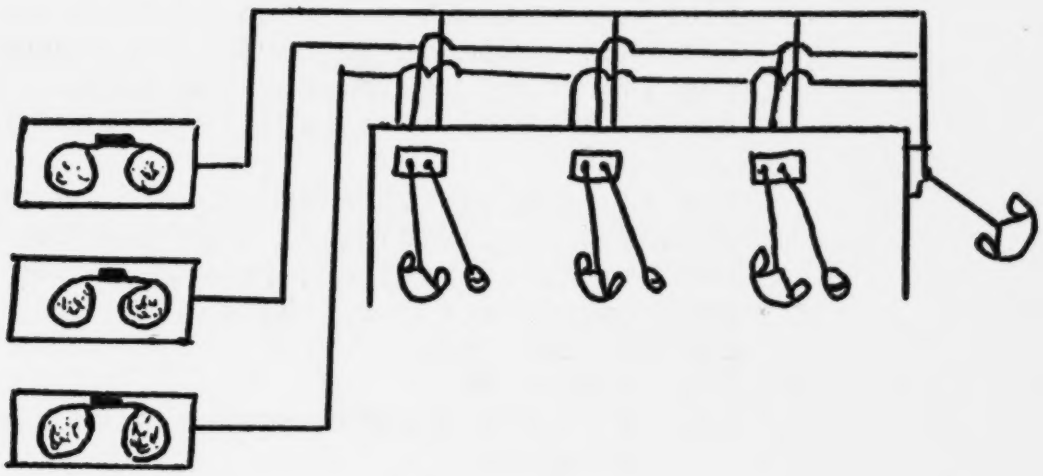


      (2) A single program source feeding a program into one or several student positions each equipped with an amplifier, a microphone and earphones. Monitoring is possible at each student position or at a panel at the end of the row of student positions.

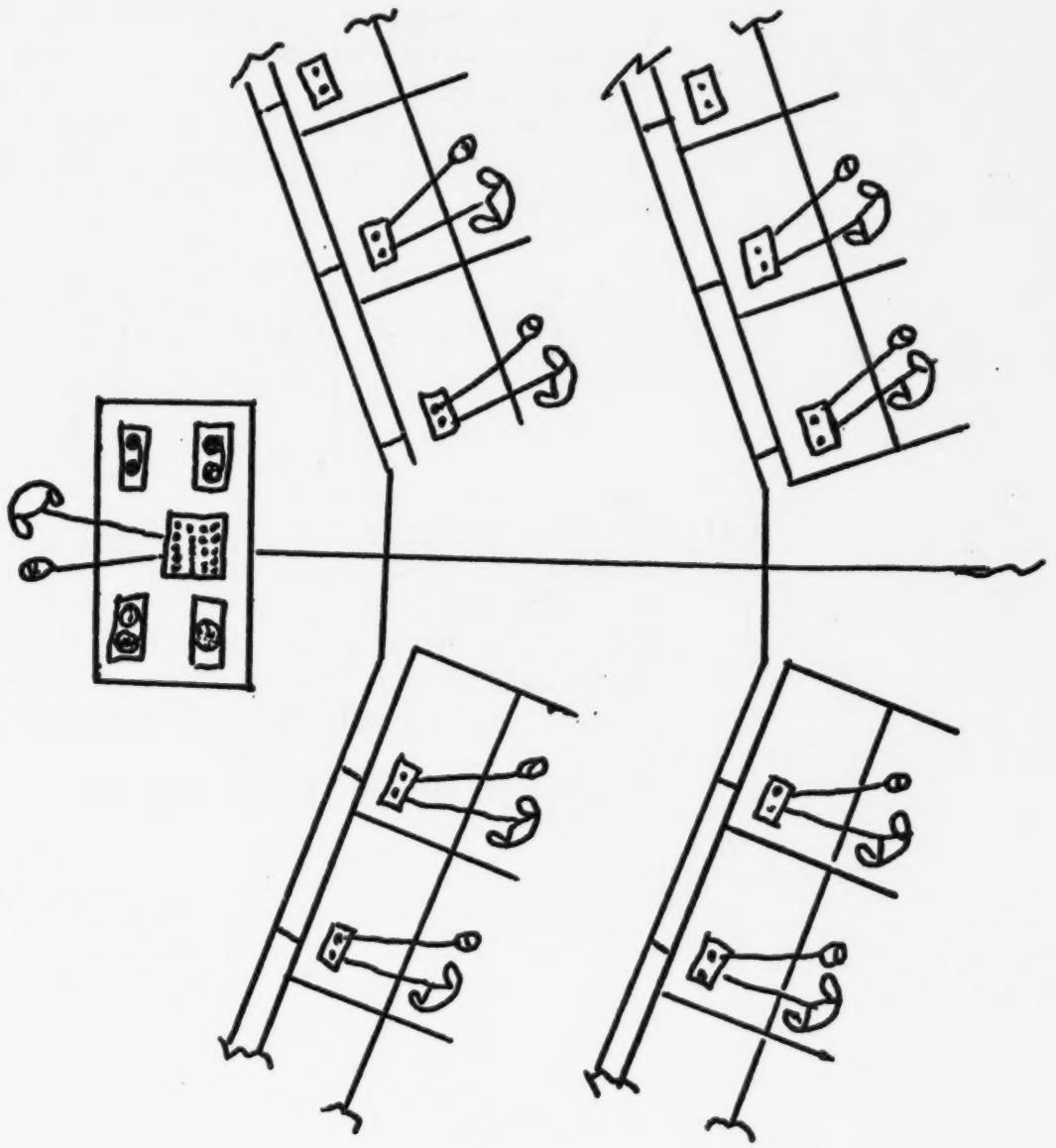


      (3) Several program sources feeding programs into a desired number of student positions each equipped with an amplifier and a program selector switch, a microphone and earphones. Monitoring is possible in the student position or at a panel at the end of the row of student positions.

      (Illustration on next page.)

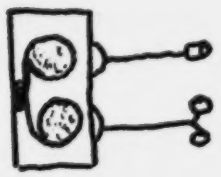


(4) A central control provides for the originating and distribution of the programs, monitoring and intercommunication facilities to the desired number of student positions.

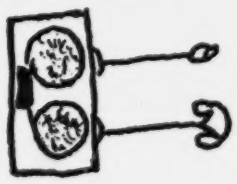


3. Audio-active-record equipment or installation.
   a. Supplies a program to the student through his earphones. With a microphone and a tape recorder, the student can record the program and his own responses while he hears his own responses through his earphones. It can provide for one or more program sources and for listening, responding, and recording by as many students as desired.

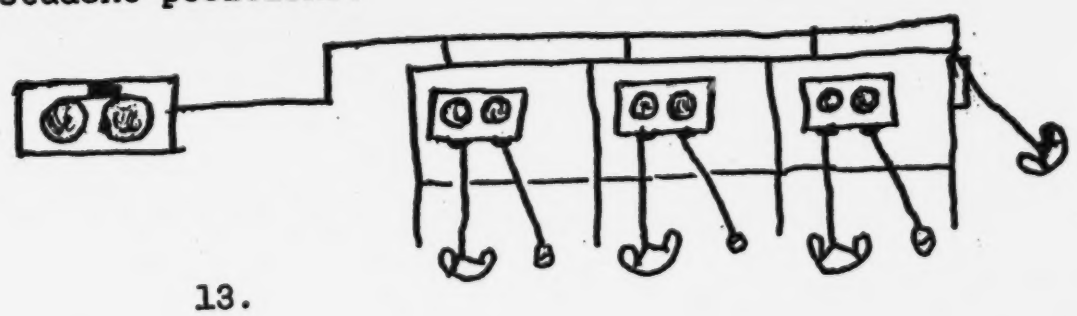
      The audio-active-record installations can be placed in a portion of the regular classroom, in a small room adjacent to the classroom, in the library, or in another adequate space which can be easily supervised.
   b. May consist of:
      (1) A single tape recorder, with a microphone and earphones, to play a pre-recorded tape with pauses for student repetition. This installation is not recommended because, if the student records his responses in the pauses, the whole tape will have to be erased to clear the student responses.



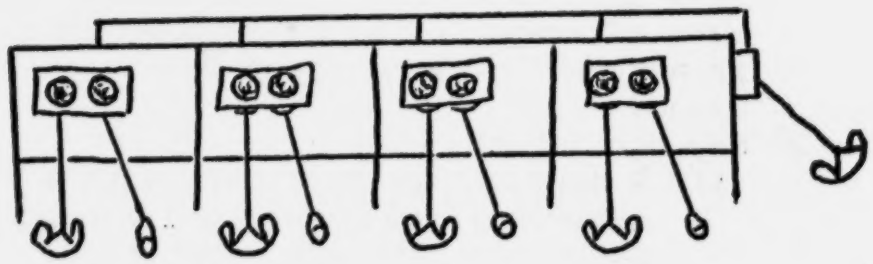
      (2) A single dual-channel tape recorder, with microphone and earphones, which can playback the master track can playback and record on the student track.



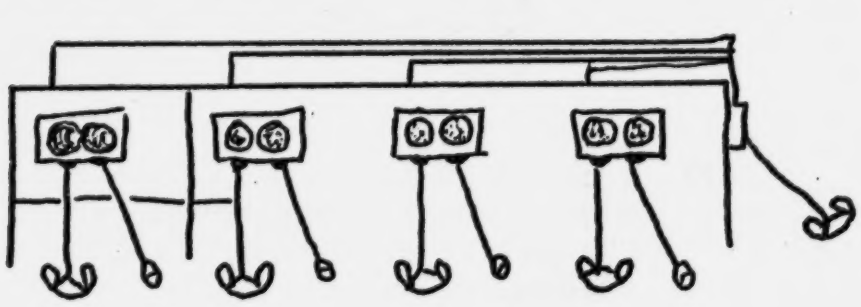
      (3) One program source feeding into one or several student positions, each equipped with a tape recorder, a microphone and earphones. Monitoring by the teacher can be arranged at the student position or at a panel at the end of the row of student positions.



(4) One program source in one student position feeding the program--not that student's response--into other student positions which are each equipped with a tape recorder, a microphone and earphones. The program source should be a dual-channel machine. Monitoring by the teacher can be arranged at the student position or at a panel at the end of the row of student positions.

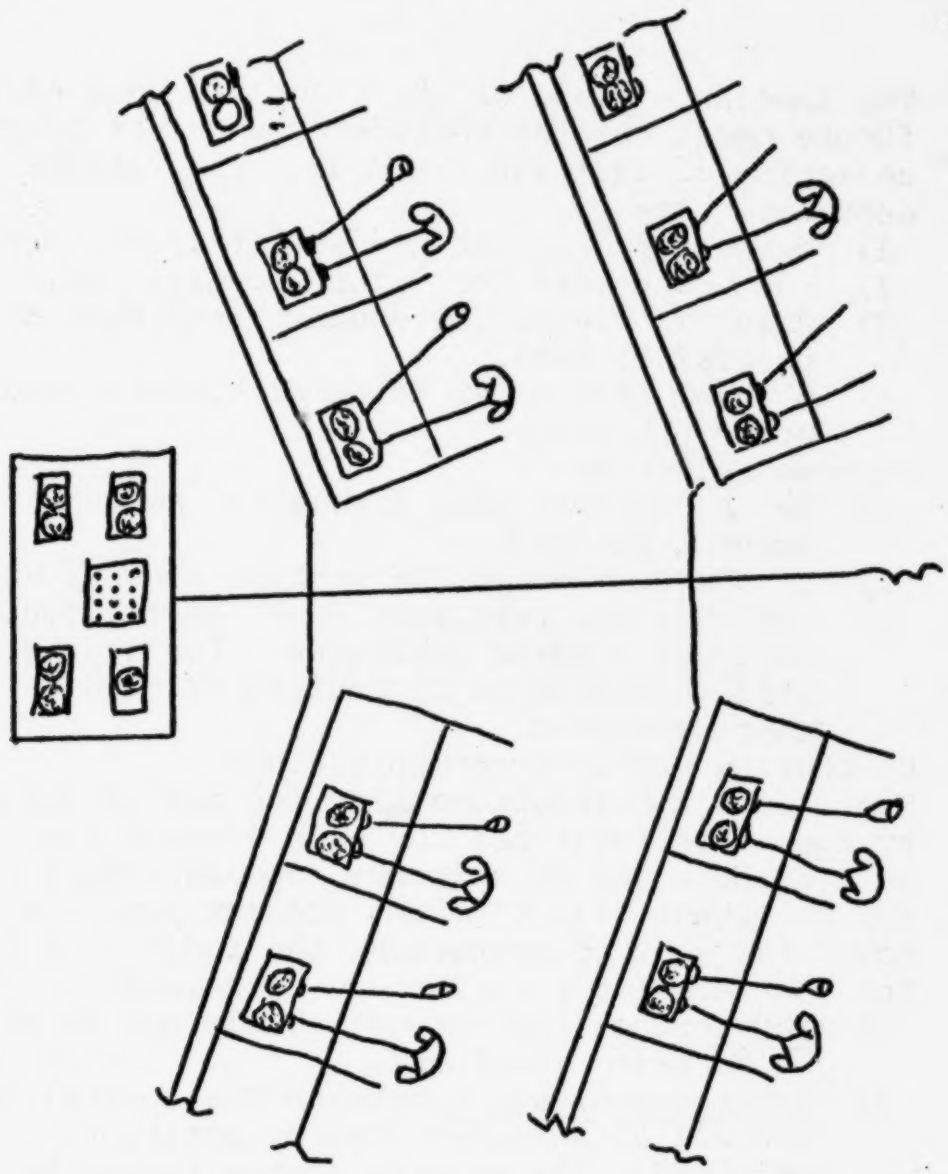


(5) A number of student positions each equipped with dual-channel recorders, a microphone and earphones. Monitoring by the teacher can be arranged at the student position or at a panel at the end of the row of student positions.



(6) A central control which provides for originating and distributing the programs, monitoring any student, and inter-communicating with the desired number of student positions, each equipped with a tape recorder, microphone and earphones.

(Illustration on next page)



4. The central control for a laboratory installation. A central control unit may consist of program sources and a simple monitoring system which only permits listening to the activity in the student position, or it may be a more complex facility providing for supplying and distributing lesson programs, monitoring and intercommunication, and recording with various combinations of student positions:
   a. Program sources:
      Programs originate from one or several of the following sources: tape recorders or playback units, record players or disc players, radio, TV, sound projectors, and microphones. The number of program sources should meet the needs of the school and be coordinated with the distribution system. Provision should be made for additional program sources as needed.
   b. Distribution of lesson programs:
      Systems currently available may provide initially for a large number of channels (up to 12), others make provisions for additional channels as needed. (This may involve additional furniture and therefore space.) Still others are designed with a limited number of channels and do not provide for additions.

The immediate needs of the school as well as its future needs must be considered when the initial selection of equipment is made. The factors to be considered are:

1) Number of channels needed for lesson programs.
2) Channel needed for intercommunication.
3) Channels needed for student recording at the central control.
4) Channel needed for external sources: radio, TV, sound projector.

c. Program selection:
   1) By the student with a selector switch in the student position.
   2) By the teacher at the central control where selector switches may represent rows, small groups, or individual student positions. For greatest flexibility selection by individual student position is recommended.

d. Monitoring and intercommunication:
Monitoring and intercommunication can be accomplished by individual switches for each student position or by a combination of switches, one selecting the row and the other selecting the student position in that row. For ease of operation, the individual switches for each student position are recommended.
   1) Monitoring: The student should not be aware that he is being monitored.
   2) Intercommunication between the central control and all or selected student positions can be provided. The program source should be disconnected to permit perfectly intelligible intercommunication between student and teacher.
   3) A signaling system to the central control indicating that the student in a given position requests intercommunication can be provided. A light signal rather than buzzers or chimes is recommended.
   4) An 'all call' system which overrides all lesson programs and establishes immediate communication between the central control and all student positions can be provided.

e. Recording can be controlled at the central control in the following situations:
   1) When there are no recording facilities in the student position.
   Sufficient recording facilities should be provided; recording can be done without the student's knowledge, if desired; and provision can also be made to record any conversation between the teacher and the student.
   2) When recording is done remotely.
   Some systems provide for remote recording where this function is performed in a completely separate unit.

3) When there are recording facilities in some or all the student positions.
Control of the student recording facilities from the central control may be desirable to insure proper coordination of the master recorder with the student recorder. Dual-channel recorders, designed to record the master channel in the student position, can be controlled from the central control. An automatic volume control for both master and student recording may be desirable. Such units should also be wired so that they can be used independently. Provision can be made for tape duplication from the master recorder to the student recorders. For this purpose, control of the student recorder should be at the central control.

f. Switching:
A three-position lever-type switch, one for each student position, makes the connections for intercommunication, monitoring, or off or neutral. A four-position lever-type adds connection for recording at the central control from the student position.

SIZE AND SCHEDULING OF A LABORATORY

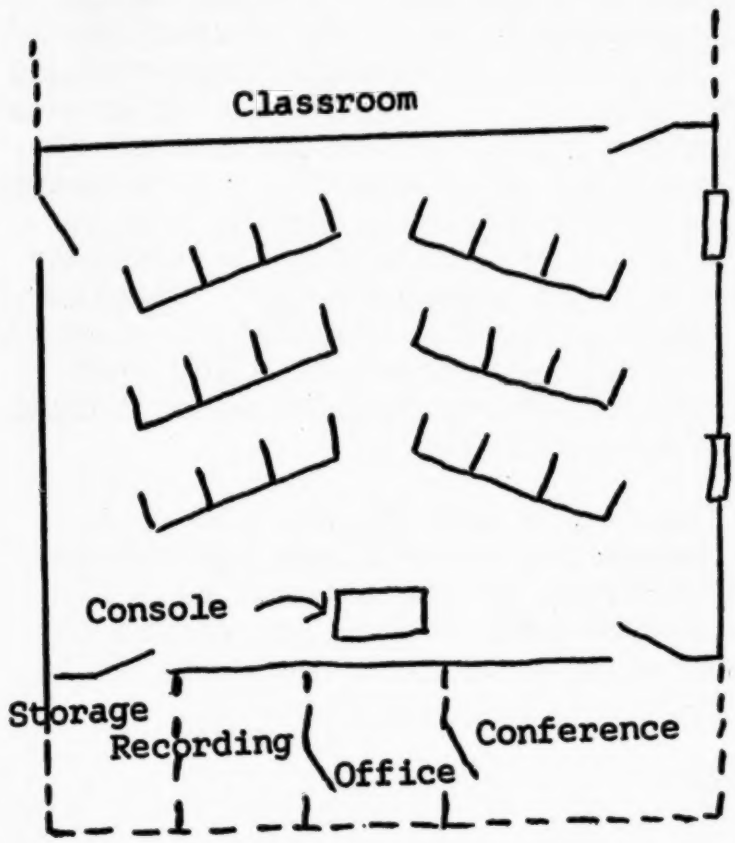
A. Size of installation:
The size of the installation and the number of student positions is computed according to: 1) the number of students in the largest class, 2) the desired number of laboratory periods per week (minimum of 2 half-periods), and 3) the number of periods in the school day. Additional facilities and time for individual study, make-up, and study hall use should be considered. If the installation is to be used entirely on an individual student basis (library method), the size of the installation is computed on the basis of: 1) the number of students involved, 2) the amount of time they are required to spend in the laboratory, 3) the amount of time during the school day available for laboratory use, and 4) the time when students are available to use the laboratory.

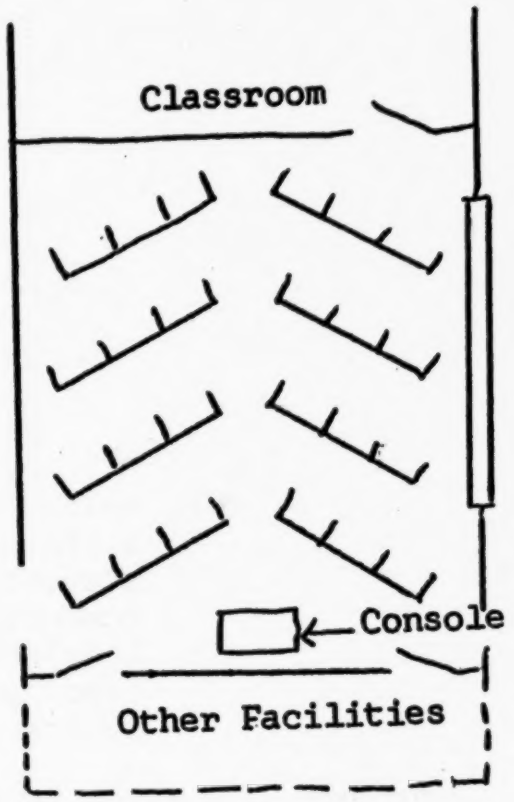
B. Scheduling:
Since it is generally not advisable to keep the student in the laboratory longer than 20-30 minutes, with careful scheduling it is possible for two classes to use the laboratory in a single period. It is also possible to schedule two or more small classes or groups in the laboratory simultaneously.

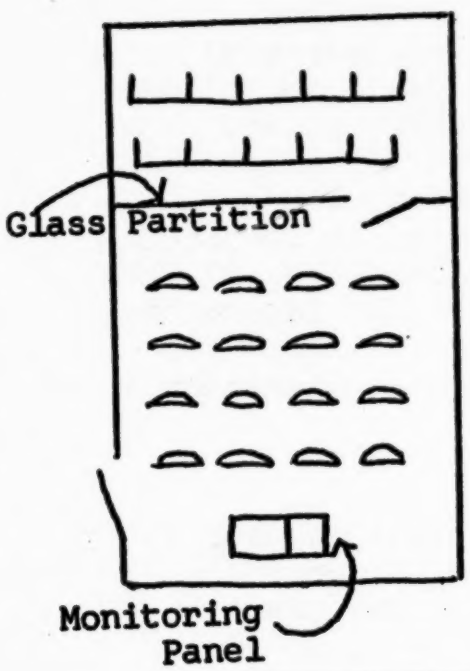
LAYOUT, SPACE, FACILITIES AND ARCHITECTURAL CONSIDERATIONS

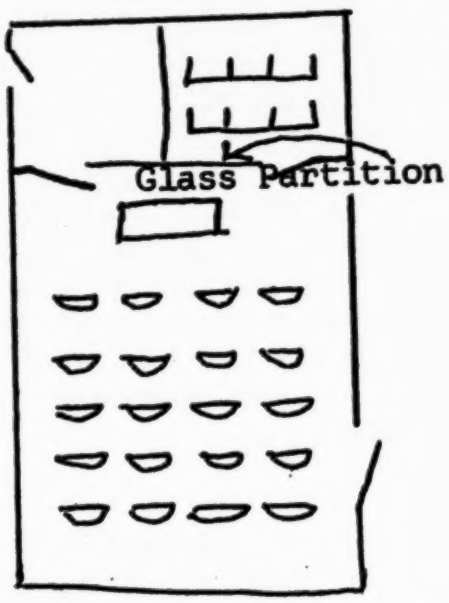
A. Layout:
Unobstructed visual contact between the teacher at the central control and the student in his position is essential.

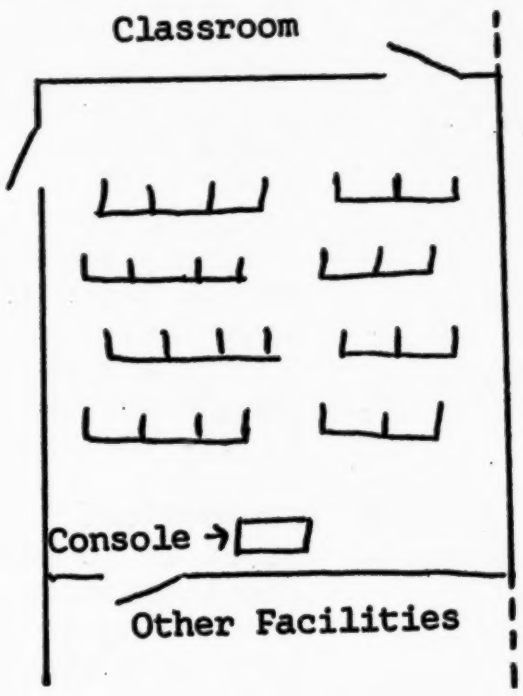
SOME POSSIBILITIES FOR LAYOUT

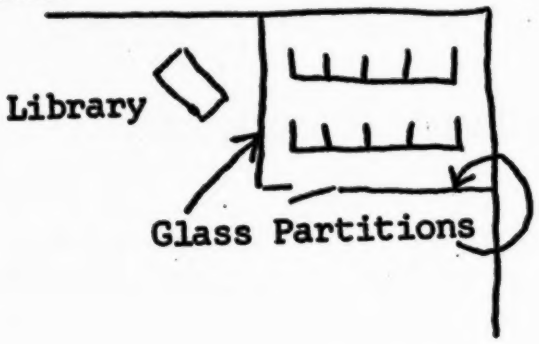












There should be no obstruction in the line of sight between each student position and a screen placed at the front of the room. Provision shall be made for adequate aisle space for projection equipment and easy access to the rows of student positions and to each student position. In many locations straight rows of student positions are undesirable. In such cases staggered rows or chevron installation should be used. Crowding of student positions and the central control into too small an area creates the following hazards which should be avoided:

1. Limited aisle space in the rows and along the sides of the student positions may be dangerous in case of emergency;
2. Students in the front row will have a distorted view of the projection screen;
3. The ambient noise level in the room is greatly increased and difficult to control; and
4. Ventilation problems are magnified and will cause discomfort too.

B. Space:
A minimum of 12.5 square feet of floor space is required for each student position. In addition, space for aisles, the central control, storage facilities, projection equipment and a minimum distance from the front row of student positions to a screen, must be calculated.

C. Facilities:

1. Adjacent classroom: If the laboratory is used by each class for one half a period, an adjacent regular classroom should be made available to allow for rapid exchange without disturbing other classes.
2. Storage: Adequate storage space for tapes and equipment should be provided in or next to the laboratory. Crowded storage facilities result in confusion, particularly with tapes which are difficult to identify.
3. Office and workroom: Office space and work area should be available immediately adjacent to and connected with the laboratory. A window permitting visual supervision of the laboratory is desirable. The work area should be equipped for editing and duplicating tapes, listening to student recordings, previewing visual materials, listening to pre-recorded materials, etc.
4. Master recording booth: To insure good master recordings, a recording booth should be provided. This booth should be at least 8 by 4½ feet, equipped with double doors or a Riverbank type door, acoustical treatment on ceiling and walls, incandescent lights, a silent heating system, silent ventilation or air conditioning. To obtain best results, the actual recording equipment should be located outside the booth; only a microphone connected to the recording equipment and an 'on-off' switch should be in the booth.
5. Conference room: A conference room accommodating 8-10 students should be provided adjacent to the laboratory.

It would allow the regular teacher to work with small advanced classes or special groupings of students while the laboratory is operated by an assistant or another teacher.

D. Location:
In order to minimize the level of background noise in the laboratory, it must be located away from outside noise such as street traffic and playing fields, and from inside noise such as the gymnasium, music rooms and vocational areas. All foreign language facilities and classrooms should be grouped within the building.

E. Architectural considerations:
1. The space provided must be large enough for the desired installation
2. Provision should be made for related facilities
3. Provision should be made for expansion of space and facilities
4. The room provided should be treated for sound if the ambient noise level interferes with instruction. The following should be checked: doors, ceilings, walls, hard surfaces, windows, fluorescent lights, ventilating and heating systems.
5. Wiring and wiring facilities should be checked for adequate power and safety for the laboratory.

INSTALLATIONS AND EQUIPMENT SPECIFICATIONS

The following statements are arranged to give a brief indication of the function, "required" specifications, and optional characteristics, or specifications for each item wherever such information is applicable. The "required" specifications must be met for equipment or materials to be approved for purchase.

INSTALLATION, SYSTEM AND WIRING SPECIFICATIONS:

A. Installation specifications

Required specifications

1. Language laboratory facilities must be located away from outside noise (street traffic or playing fields) and from inside noise (gymnasia, vocational areas, or music rooms).
2. Provision must be made for adequate space: a minimum of 12.5 square feet of floor space must be provided for each student position; all other facilities and passage-ways require additional floor space.
3. All facilities must be easily accessible.
4. There must be unobstructed visual contact between the teacher seated at the central control and each student seated in his position.
5. There must be no obstruction the line of sight between each student position and a projection screen placed at the front of the room.
6. The installation must provide for expansion both for additional functions and for additional student facilities.

B. System Specifications

Functions

The system as a whole--as well as any unit used independently--should have a well-balanced, natural tone and be capable of reproducing the most subtle foreign sounds, without overemphasizing or underemphasizing any aspects. Due to the physical nature of sound reproduction, minimum requirements must be exceeded in order to provide the desired characteristics within the desired range. In a language laboratory system the weakest link concept applies. The system can only reproduce sounds within the range of the most limited component. Systems with limited frequency responses and excessive harmonic distortions can not provide for an objectively well balanced, natural tonal reproduction. In addition, such systems create a subjectively distracting factor for the listener. This latter factor may have as detrimental an effect on the learning outcome as the failure of the system altogether to reproduce certain sound characteristics.

Required Specifications

1. The system must have an overall frequency response of no less than 100-9000 cps (cycles per second) within plus or minus 2 db (decibels) not including transducers (earphones and loudspeakers).

2. The transducers (earphones and loudspeakers) must have a frequency response of at least 100-9000 cps plus or minus 6 db.
3. The system, including program outputs and intercom must be essentially flat, properly terminated and of such impedance that the output level will not vary in excess of 2 db between an unloaded condition and a fully loaded condition.
4. Overall system distortion (including preamplifier, amplifier, and terminating equipment but not including transducers) must not exceed 3% total harmonic distortion when operated under the condition to deliver 33 db with 0 db= .006 watts acoustical energy from the student's earphones.
5. Signal-to-noise ratio must be at least 45 db. with gain controls, set for distributing normal program levels of microphone and tape.
6. The cross talk into a student's listening channel from other channels must in no case exceed the signal-to-noise ratio or 45 db under normal operating conditions.
7. The program distribution must be made at a predetermined voltage level, e.g. 1 volt, 4 volts, 10 volts.
8. Each facility must have a standard level, self-terminated, low impedance output and a high impedance bridging input.

Optional characteristics

1. Amplifier outputs should be self-terminating and of low impedance; amplifier inputs may be of the high impedance bridging type.
2. Systems employing balanced program line circuits are preferred.

C. Wiring Specifications

Required Specifications

1. The system installation and the necessary wiring must meet all local ordinances, regulations and codes.
2. For permanently installed equipment requiring 110-120 volt, 60 cycle A.C., at the central control and at the student position, the power must be supplied through polarized 3-wire duplex receptacles of the grounding type (similar to Hubbell Catalog No. 5262). These receptacles must be mounted in outlet boxes and must be fed by lines protected by a continuous approved metal conduit or raceway.
3. If amplifiers of the A.C. - D.C. type (transformerless) are used, an isolation transformer must be installed in the 110-120 volt, 60 cycle line for safety purposes.
4. All metallic parts which might be contacted in normal operation must be at ground potential.
5. Where cables would be subject to damage or abuse, audio and control-circuit wiring between pieces of equipment must be protected by conduit or raceway. Floor troughs, if used at all, must be located to avoid any possibility of accidents, such as tripping.

6. Cables and other shielding facilities must be grounded at one point.
7. Amplifiers and power suppliers must be easily disconnected: for replacement and servicing, soldered connections are not acceptable.
8. Power outlets must be convenient to each piece of powered equipment and the power circuits (110-120 volts, 60 cycles) must be of ample capacity to carry the maximum load. A separate circuit (or circuits) to feed the system is recommended. Each circuit must be properly protected either by fuse or circuit breakers. Where fuses are used, slow-blow variety is recommended.
9. One master switch with a large indicator light must control the entire system.
10. Audio or low-voltage control circuits must be carried in conduit separate from power wiring.

Optional Characteristics

1. If conduits are used for installation, they should be large enough to permit pulling through additional cables which may be required for projected expansion.
2. It is recommended that not more than 10 student positions be fed from each 15 ampere branch circuit.
3. It is recommended that separate circuits be installed for the central control and for outlet receptacles designed to supply projection equipment.
4. Microphone and other cables carrying low-level audio should preferably be individually shielded. Where shielded cables are used, they should be jacketed to facilitate controlled ground positions.
5. In new building construction, conduits or raceways should be installed to provide adequate connections between the central control and student positions, projector locations, and similar areas.

LANGUAGE TEACHING EQUIPMENT SPECIFICATIONS

A. Required general specifications

1. All equipment must be durable and able to withstand long, continuous use.
2. All switches and controls must be clearly marked and able to withstand frequent and abrupt manipulations. All switches must meet EIA specifications.
3. Equipment must not generate excessive heat. Where applicable, adherence to U.L. specifications is required.
4. There must be no mechanical or electrical hazard to the operator. Where applicable, adherence to U.L. specifications is required.
5. All electrical units must be compatible with each other, and, preferable, also with units currently used in the school.
6. All recording characteristics must be compatible: all recording equipment must conform to the NARTB (NAB) equalization standards.
7. All equipment must be usable or adaptable in an expanded installation.

B. Language Laboratory Components and Individual Machines

1. Acoustic partitions or dividers
see: student position.

2. Amplifiers or Pre-amplifiers
Function
To amplify a signal to the required level.
Required specifications
a. The power output must be sufficient to drive the desired number of earphones or loudspeakers.
b. The frequency response must be at least 100-12,000 cps, plus or minus 2 db.
c. The signal-to-noise ratio must be no less than 45 db.
d. Total harmonic distortion must not exceed 3% at the normal operating level.
e. Amplifiers and pre-amplifiers must be matched to the equipment with which they are used.
f. A VU meter must be provided at the central control to indicate output volume.
g. Where there is an amplifier in each student position, it must provide 2 inputs, one for the microphone and one for the line from the source; and 2 outputs, one for the earphones and one to connect with the central control.
h. Sufficient inputs and outputs must be provided for all intended functions.
i. All controls must be clearly and permanently marked.
j. All amplifiers must be readily accessible for servicing.
k. At the student position a restricted range volume control must be provided.

Optional Characteristics
a. VU meters may be desirable with recording facilities in the student position.
b. Plug-in type amplifiers or amplifiers wired with connectors, are desirable for ease of servicing.

3. Central Control
Functions: see section on language teaching equipment.
Required specifications:
a. Facilities and functions must be adequate in terms of the instructional program.
b. Provision must be made for ease of operation and teacher comfort.
c. It must be installed to permit direct visual contact between the teacher seated at the controls and each student position.
d. Sufficient table top space must be provided for working with accessories and supplies.
e. The table top must be of a hard-finish, high-resistant material.
f. All equipment must be flush-mounted.
g. All wiring must be concealed and enclosed.
h. Ready access to all equipment, components, and wiring must be provided for ease of servicing.

i. An 'all-call' feature either through the system or by means of a loud speaker must be provided.
j. To monitor, the instructor's earphones must connect to any student position selected with no click or audible change in level: the input to, and the activity in, the student position must not be affected.
k. To communicate, the lesson program to the student position selected must be disconnected and the teacher intercom circuit must be connected to the student position without affecting other student positions tuned to the same channel.
l. Selector switches must have self-wiping, self-cleaning contacts: the correct combination of shorting and non-shorting contacts must insure a minimum of open circuits with no shorting together for non-related signals during switching. All switches must meet EIA specifications.
m. A signal light indicating when unit is turned on must be provided.
n. Where indicated, without requiring major rewiring or rebuilding, the unit must provide for expansion in terms of:
    1). Additional functions
    2). Additional student positions
    3). Additional facilities
o. For individual components refer to the respective required specifications.

Optional Characteristics
a. Unit may have to be installed on a platform to provide for proper visual contact.
b. Expansion of functions and facilities should be possible without excessively increasing operating complexity or requiring additional space.
c. Program selection may be either in the student position or at the central control.
d. Individual switches for each student position insure operating convenience, simplicity of wiring and flexibility of functions.
e. Table top should have glare-proof material.
f. A cover and locking device for the central control may be desirable.

4. Connecting wire, cables
see: Wiring Specifications

5. Disc player
Function: It is designed to play records or discs in a laboratory or custom mounting. It generally does not have an amplifier or loudspeaker and is an integrated unit which consists essentially of a turntable and pick-up arm.
Required specifications:
a. The disc player must be of the manually operated type.
b. It must provide for standard and microgroove playing.

c. It must have at least 3 speeds: 78 rpm, 45 rpm, 33 1/3 rpm.
d. It must accommodate discs up to 12" diameter.
e. The mechanism must be free of hum and rumble.
f. The turntable must be level, shock-proof and vibration-free.
g. The turntable must operate smoothly and at a constant rate of speed.
h. The turntable must be equipped with a protective pad (rubber, cork or the like).
i. The idler must be disengaged when mechanism is in the neutral or off position.
j. All controls must be clearly and permanently marked.
k. Cartridges must be ceramic or magnetic, and must be easily replaceable.
l. A sapphire stylus of 0.003" radius must be provided for standard recordings and a diamond stylus of 0.0007" - 0.001" radius must be provided for micro-groove recordings. The stylus must be easily replaceable.
m. The tracking force (stylus pressure) must be adjustable to 4 grams.
n. Provision must be made for adjusting stylus pressure.
o. The overall frequency response must be at least 50-12,000 cps plus or minus 2 db.
p. Unit must be installed to permit ease of servicing.
q. An armrest must be provided which permits locking the arm in the 'up' position.
r. A pad must be provided between armrest and turn-table to prevent damage to stylus.
s. The power cord must have a 3-wire, polarized plug. An adapter may have to be furnished.

Optional Characteristics:

a. An automatic start-stop device is not recommended.
b. A strobe disc or light is a desirable feature to insure accurate speed.
c. Provision for variable speed is available.
d. Drive may be by either synchronous or shaded pole motor.
e. Motor should be rated for continuous duty.
f. A spindle or adapter for 45 rpm (7") records should be provided.
g. A signal light indicating that unit is turned on should be provided.
h. Switching and wiring should allow for connection of the unit with a master recorder for copying of records.

6. Disc player assembly

Function: This is a self-contained record player which can be used in the laboratory or the classroom.

Required specifications:

a. See disc player, required specifications.
b. Unit must have matched amplifier and provide sufficient amplification for intended use.

c. Unit must have internal or external speaker.
d. Unit must have clearly and permanently marked volume and tone controls.
e. Unit must provide for an output for external speaker or earphones.
f. Casing and hardware must be substantial enough to prevent damage and protect the mechanism.

Optional Characteristics:

a. See disc player: optional characteristics.
b. Unit may provide for microphone input.
c. Unit may provide for several outputs for earphones.
d. If earphones or other outputs are used, the internal loudspeaker should be disconnected automatically.

7. Earphones

Functions: Earphones provide individual listening from a program source. The ability of the earphones to reproduce sound is usually the limiting factor in the system. Students must not be handicapped by poor earphones, whether used in a laboratory or with a single playback device.

Required specifications:

a. Earphones must be reasonably lightweight and comfortable.
b. Over-the-head earphones must have adjustable headbands.
c. Both earpieces must have receivers; the hollow tube conductor from one earpiece to the other is not acceptable.
d. The connecting cord must be of such length as to prevent the earphones from striking the floor.
e. Crystal earphones, if used, must be of sealed design.
f. In the 100-5,000 cps band, the acoustical response as measured in a standard coupler must be within plus or minus 4 db and from 100-9,000 cps the response must be within plus or minus 6 db.
g. The total harmonic distortion must not exceed 1% in the 100-5,000 cps band when delivering 90 db (referred to .000204 dynes/cm2) into a standard 6 cc coupler.
h. Under-the-chin earphones are not approvable.

Optional Characteristics:

a. Earphone cushions - rubber, foam rubber, chamois skin - are available and may be used to reduce extraneous noise.
b. Combination earphones-microphone are available, and are recommended only if separate earphones and a microphone cannot be used.
c. Earphone should cover the ear to exclude extraneous noise.

8. Jackbox

Function: A jackbox is designed to receive and distribute

sounds originating from one source to one or more earphones. It is connected to the output of the playing unit and provides jacks for earphone plugs.

Required specifications:

a. All internal wiring must be attached to one removable cabinet part to localize service.
b. The cord from the jackbox to the plug must be of sufficient length to permit grouping of students according to intended pattern.
c. The cord must be anchored in the jackbox to prevent undue strain on the wired connections.
d. Dis-assembly and re-assembly must be easily done for servicing.
e. Jacks must be substantial and of durable quality.
f. Permanently mounted boxes must be installed to permit ready servicing.
g. Where individual volume controls are used, they must be easily identifiable with the jack to which they are wired.
h. Control knobs must be fastened with set screws and have brass inserts.
i. Where low impedance earphones are used, special circuits to balance the varying loads must be provided.
j. Plugs with metal (shielded) shells must be used.

Optional Characteristics:

a. Box may be of metal or wood.
b. Individual volume controls are recommended.
c. Jackboxes may be used in series--one connected to the other--and adequate numbers must be provided for the required number of earphones.
d. Jackboxes providing from one to twelve jacks are available.
e. Care must be taken to limit the number of earphones to the number which can adequately be driven by the program source.
f. To prevent damage, jackboxes should be fastened securely at the point of use.
g. The base of the box must be equipped with rubber or plastic feet to prevent slipping and marring.

9. Loudspeaker

Function: For group listening to programs from various sources.

Required specifications:

a. The loudspeaker and power amplifier must be adequate for intended use.
b. The frequency response must be reasonably uniform from 100-12,000 cps.
c. The power handling capacity must be at least 12 watts.
d. The loudspeaker must be mounted in baffles or cabinets designed for the particular type of speaker.
e. See: self-contained power amplifier for further specifications.

Optional Characteristics:

a. The location of the loudspeaker in the classroom should provide the most efficient sound transmission possible.
b. Adequate provision should be made to connect the loudspeaker with various program sources.
c. The loudspeaker may be tied in with a central control as an "all-call" feature.
d. Cone-type loudspeakers of at least 8" diameter are suitable.
e. A loudspeaker for a single classroom should be driven by a 10 watt amplifier. Two or more loudspeakers may be desirable, depending on the space and location.

10. Magnetic disc recorder

Functions: to record and play back magnetic discs.

Required specifications:

a. The recorder and playback unit must have adequate input and output connections for individual and system use.
b. Recording and playback elements must meet the specifications for tape recorder and disc player.

Optional Characteristics:

Because of inadequate fidelity in response, such units are not recommended.

11. Microphones

Function: to be used with individual recording devices and in laboratories at the central control and in student positions.

Required specifications:

a. The frequency response must be essentially flat and uniform from 100-9,000 cps.
b. The impedance and output level must match the preamplifier with which the microphone is used.
c. Crystal microphones are not recommended, but if used, they must be of sealed design.
d. The microphone at the central control must be of good quality, preferably of the cardioid type.
e. The microphone in a recording booth must be omnidirectional and of superior quality.
f. A grill must be provided so that the unit is protected from abuse.
g. Plugs with metal (shielded) shells must be used.
h. There must be no exposed microphone wires at the student position.

Optional Characteristics:

a. Dynamic microphones are generally recommended because of their greater ruggedness, wider response, and resistance to heat and humidity.
b. Variable reluctance microphones are not recommended because they give relatively poor response, and because they are more subject to hum pickup.
c. Sensitivity should be adjusted for pickup at close range.

d. An "on-off" switch may be provided on the microphone itself.

12. Microphone mounting

Function: To fasten microphones at the central control or in the student position.

Optional Characteristics:

a. In the student position the microphone should be permanently mounted.
b. Mounting should be on a boom arm--hollow tube on a swivel base--or gooseneck with a flange base. The boom arm is recommended. The goose-neck is not recommended since it tends to lose its resiliency and frequently creaks; the flange bases tend to break or loosen.
c. Movable stands or hand held microphones should not be used in the student position. Movable stands, hand held or lavalier microphones should be used at the central control only if absolutely necessary. If stands are used, they must be heavy and have a wide base to prevent tipping.
d. Combination earphone-microphones are available. They are recommended.

13. Mixers

Function: A device which permits combining sound signals to or from two or more sources simultaneously while controlling the volume independently for each source.

Required Specifications:

Mixers must be selected on the basis of intended use in a total installation or with a single recording unit.

Optional Characteristics:

The mixer may be of the powered or non-powered type.

14. Recording booth

See: Language Teaching Equipment: Layout, Space, Facilities and Architectural Considerations.

15. Self-contained power amplifier

Function: designed to drive loudspeakers or an "all-call" feature in the central control.

Required specifications:

a. The amplifier must deliver 10 watts of audio power at less than 2% total harmonic distortion when driven at normal levels.
b. The frequency response must be from 100-12,000 cps plus or minus 2 db.
c. The signal to noise ratio must be 60 db below 10 watts output.
d. Output impedances must be provided for 4-8-16 ohms.
e. Suitable receptacles must be provided for all input and output connections.
f. The unit must operate on 110-120 volts, 50/60 cycles AC.
g. All controls must be clearly and permanently marked.

16. Student position

Function: the student position or booth is designed to provide an individualized working area which is semi-soundproof and which isolates the student in order to increase attention and willingness to respond.

Required specifications:

a. Side and front partitions must extend enough above, below, to the front and rear of the student's lips as he sits in position at the booth to insure adequate noise reduction and isolation.
b. There must be no obstruction in the line of sight to the central control, in lighting, or in the projection line.
c. The perforated surfaces (of hard material such as metal or composition) and interior materials (fiberglass, rockwool and other sound absorbing elements) of the partitions must have sound absorbing qualities to insure a noise reduction coefficient of .55 or better.
d. Partitions must be installed so that they are firm. Particular attention must be given to end partitions and those installed on table surfaces.
e. All equipment and components which extend beneath the booth surface must be covered to prevent tampering or hazards from contact with equipment.
f. All installed components must be readily accessible for servicing.
g. All wiring must be concealed and enclosed in conduit or wiring raceways.
h. Dimensions for the table top must be at least 24" x 30", to accommodate necessary equipment and still provide adequate writing space.
i. The table top must have a hard surface which resists abuse and is easy to clean.
j. The total floor space for a student position must be at least 12.5 square feet or an area of 2.5 x 5 feet providing for booth, chair and passage behind the student when seated in position.
k. Provision must be made for storing earphones when not in use.

Optional Characteristics:

a. The student position may be of metal or wood construction.
b. The student positions may be single or multiple units.
c. Glare proof material on the table top and partition surfaces is desirable.
d. The lower part of front partitions should be sound absorbing.
e. The upper part of front partitions may be of glass, plexiglass, or may be left open.
f. All equipment should be flush mounted.
g. Provision for AC outlets should be made in student positions not equipped with recording units.

h. Space should be provided for books, purses, etc., without interfering with the working surface or student comfort.
i. The front side of a student position should be protected by a chair rail.
j. Sliding front panels should not be used because they are troublesome to operate and they interfere with visual contact between student and teacher.

17. Tape recorder
Functions:
a. General: Recording and playback units of varying designs are available, each generally suited to given purposes. Distinctions must be made according to the basic function of the unit and its recording and playback characteristics.
b. Basic functions by types of units:
1). Tape recorder: Generally a complete unit which provides for recording, playing and erasing a tape.
2). Playback unit (also tape player): Provides for playing a recorded tape. This unit cannot record or erase.
3). Tape deck (also motor board, tape transport): Provides for playing or recording and erasing a tape but does not have a pre-amplifier, power amplifier, speaker or case. It must be used in connection with other components, such as at the central control.
4). Portable tape recorder: Generally this is a tape recorder designed to be easily moved about. In most cases it requires an AC power supply but some portable recorders are self-powered and use batteries. For real portability weight of the unit must be considered.
5). Self-powered tape recorder: Generally a completely portable unit containing its own power supply, either from batteries or a spring-driven motor.
6). Cartridge tape recorder: May be a complete unit or a tape deck designed to use a tape enclosed in a cartridge. There are two types of cartridge units:
a). A continuous loop tape cartridge which moves the tape endlessly past the heads, automatically rewinding it on the same reel. Backup is not possible and recording time is limited by the size of the cartridge.
b). Two-reel cartridge which is similar to the regular tape arrangement with the tape and reels enclosed. The cartridge is placed on the recorder

as a unit and does not have to be threaded.

c. Types of recording and playback:

1). Recording tracks

a). Full track: Records and plays back the full width of the tape. A full track tape recorder can also play back a half track tape if only one track is recorded.

b). Half track: (also dual track, twin track, double track): Records and plays back on half the width of the tape. When one half is recorded the tape can be turned over and the other half used. A half track recorder can usually play back full track recordings.

c). Single track: Usually records full or half track down the middle of the tape. Check carefully before purchase.

d). Quarter-track (four-track): Has 4 tracks which can be used separately for monaural recording or in pairs for stereo recording. If two tracks are used, the reel may be turned over to record on the other two tracks.

2). Sound recording and playback:

a). Monaural: Records or plays back on one track. The sound reproduction has no distinction of depth.

b). Binaural: Recording is done on two tracks from two separate systems. When played back through earphones the reproduction gives depth and realism.

c). Stereophonic: Recording is done in the same manner as binaural except that microphones to pick up the sound are placed differently. Playback is through loudspeakers placed in positions similar to the microphones to give depth to the reproduction.

d). Dual channel: Recording is possible on two tracks, but for language use these recorders are designed to record a program on one track. When replayed the student may hear the basic recording from the 1st channel (or track) and may record his response on the 2nd channel (or track) and then replay the whole recording for comparison. The recorders can be adjusted so that the student cannot erase the 1st channel, or "master", recording.

Required specifications:

a. Provision must be made for tape speeds of 7½ and 3 3/4 ips.
b. The unit must accommodate at least 7" reels.
c. Frequency response must be at least 100-12,000 cps within plus or minus 2 db at 7½ ips or at least 100-8,000 cps within plus or minus 2 db at 3 3/4 ips.
d. The signal to noise ratio must be at least 50 db.
e. Flutter and wow must not exceed 0.2% at 7½ ips.
f. Total harmonic distortion must not exceed 2% at normal recording level. Reference point is 1,000 cycles.
g. Tape timing speeds must be correct to within 2%.
h. Unit must conform to NARTB (NAB) equalization curve.
i. Motor must be capable of continuous function for 8 hours without undue heating.
j. Separate switches for motor and amplifier must be provided.
k. Fast forward and fast reverse with positive braking action must be provided.
l. There must be outputs for earphones and external speaker and inputs for microphone, record player and radio.
m. Under normal operating conditions tape transport mechanism and controls must not permit spilling or looping of tape.
n. All controls and functions must be clearly and permanently marked.
o. All controls must be simple and must operate easily within minimum noise.
p. Adequate volume and tone controls must be provided.
q. Accidental erasure must be prevented by providing an interlocking safety device.
r. All knobs must be fastened with set screws and brass inserts.
s. Microphone furnished with the tape recorder must meet the specifications.
t. Recording heads must be fastened tightly and must be easily accessible for necessary adjustment.
u. Erase heads must remove any previous recording completely.
v. The unit must not permit shock or injury to the operator and must meet U.L. safety specifications.
w. The power cord must have a 3-wire, polarized plug; an adapter may have to be furnished.
x. Motors must have adequate ventilation.
y. In a system installation, all units must be compatible: input impedances must be consistent with other components, and output impedances must provide for either earphones or power amplifiers.

Optional characteristics:

a. Recording usually should be standard half track.
b. A master recording machine should have a separate monitoring head to permit monitoring while recording.
c. VU meters or electric eyes are desirable; neon light indicators are usually not accurate enough.
d. A pause button or pause bar is recommended, and a tape index counter is often desirable.
e. The recorder should have a signal light to indicate that the machine is turned on.
f. When dual channel machines are used in a laboratory, provision should be made to achieve balanced recordings for the two tracks. On a student unit, accidental erasure of the "master" channel should be impossible. The unit should permit tape duplication from the central control to the student units.
g. Motors may be either shaded pole type or synchronous.
h. Lever operation is recommended; push buttons are delicate and knobs are easily damaged.
i. Tape lifters to operate when the mechanism is in fast forward or reverse position are recommended to prevent head wear.
j. Automatic shut-off when tape reaches end of reel is desirable.

C. Language Laboratory Accessories:

1. Bulk Tape Erasers

Function: to erase an entire reel of recorded tape at once. (It should not be used within 3 feet of recorded tape, electronic equipment, or a watch.)

Required specifications:

a. Unit must be equipped with a push-button, spring-return catch.
b. Unit must allow for complete erasure of 7" reels or smaller.

Optional characteristics:

Unit may be hand held or may be fitted with a spindle to rotate.

2. Head Cleaner

Function: a liquid solvent which removes dirt and accumulated oxide from heads of a tape recorder.

3. Head Demagnetizer

Function: to eliminate built-up magnetism in recording and playback heads of tape recorders in order to reduce noise level.

Required specifications:

a. The pole piece must be shaped to fit the contour of the recording and playback heads.
b. The pole piece must be covered with a soft material (plastic, rubber, leather) to prevent scratching or marring.

4. Head Alignment Tape

Function: to determine if the alignment of the heads is correct.

This is a special pre-recorded tape.
Instructions must be included.

5. Labels
Function: adhesive labels for reel identification, usually available in ½" or 2" size.

6. Leader and timing tape
Function: to be used at the beginning and end of each tape to prevent damage to the recorded portion, and for insertion in a tape for editing and timing purposes. This is non-magnetic tape with spaced markings for accurate timing. It can be written on for further identification.

7. Magnetic discs
Function: to be used with magnetic disc recorders.
Required specifications:
They must be pre-grooved, erasable, and re-usable.

8. Patch cords
Function: to connect units of audio apparatus to one another or to a line.
Required specifications:
   a. Cords must have a single conductor shield with the shield soldered to the ground terminal on the plug or jack.
   b. Gauge of wire and insulation must be substantial enough for heavy use.
   c. Plugs must match jacks of machines with which they are used.
   d. Plugs must have metal (shielded) shells and permit ready repair or change of plug.
Optional characteristics:
   a. Plugs vary in shape, length and diameter. A variety should be available to match the jacks of various machines.
   b. Permanently molded plugs are not recommended.
   c. Plug adapters are available and may be necessary to convert one type to another.

9. Recording tape
Function: coated tape for recording.
   a. The tape or base is the plastic film on which the coating for recording is placed. Different colored backings are available for ease of identification. Several types of bases are available:
      1.) Cellulose acetate (also called acetate or plastic) breaks rather easily when suddenly tensed and is affected by heat and humidity.
      2.) Polyester (also called mylar) is stronger than acetate tape and will stretch before breaking. It is almost unaffected by heat and humidity. The cost is much higher than that of acetate tape.
      3.) Polyvinylchloride (also called tenzar) has almost the same qualities as polyester tape but its cost is only slightly higher than acetate tape.

b. The coating--iron oxide and a binder--is responsible for the quality of the sound on recording tape. Most coatings on first-line tapes are constant and satisfactory; second-line tapes (often sold under a different name) may have unequal and defective coating and should be avoided. Various coatings provide for greater dynamic range, low print-through, or special lubrication to reduce head wear.

c. Width, thickness and length
   1). Width: standard tape has a width of ¼". Other widths are available for use on highly specialized machines.
   2). Thickness: the common thicknesses are: 1½ mil, 1 mil, and ½ mil. For language use 1½ mil or 1 mil tape is usually used.
   3). Length: the length of the tape should be determined by the required playing time. Lengths available vary from 150' on a 3" reel to 7,200' on a 14" reel.

10. Tape clips
    Function: a plastic clip designed to hold tape in place on the reel.

11. Tape reels and cartridges
    Function: to be used as feeder, take-up or storage reels for tape.
    Optional characteristics:
    a. Reels are available from 3" to 14" in diameter. 5" and 7" reels are recommended for language work.
    b. Colored reels are available and useful for identification purposes.
    c. Reels should have 2¼" hubs; smaller hubs are difficult to thread and increase tape tension.
    d. Cartridges should be selected for use with specific machines.

12. Tape splicer
    Function: to connect ends of tape broken accidentally or cut for editing. Must be used with special splicing tape.
    a. Should make diagonal cut in tape.
    b. Should provide tape alignment guide and cutting surface
    c. Splicing tape dispenser may be attached.

13. Splicing tape
    Function: a special adhesive tape designed to splice tape ends together. Only splicing tape should be used for this purpose, for other adhesive tapes can make several layers of tape stick together.

VISUAL EQUIPMENT

A. Motion Picture Projector
   Function: to project 16 mm silent or sound films in a laboratory or classroom.

Required specifications:

1. It must accommodate standard 16 mm silent or sound motion picture film.
2. It must operate at a standard number of frames per second.
3. It must be equipped with an incandescent lamp and condenser system capable of giving sufficient light to project a brilliant image.
4. It must have coated optics of good quality.
5. It must have a speaker at least 8" in diameter. The speaker may be an integral unit or in a detachable housing fitted with a long cord and jack.
6. The amplifier must be sufficiently powerful to drive the speaker without distortion.
7. Distortion must not exceed 0.3% RMS.
8. The projector must operate on 110-120 volt, 50-60 cycle AC.
9. All controls must be clearly and permanently marked.
10. Operating, maintenance instructions and parts lists must be furnished.
11. The power cord must have a 3-wire, polarized plug; an adapter may have to be furnished.

Optional characteristic:

1. The focal length and the aperture of the objectives should be selected to suit the room in which the projector is to be used.

B. Motion Picture Projector, Magnetic Recording

Function: A projector equipped to record on and playback from a magnetic stripe affixed to any 16 mm film. (The stripe does not interfere with the optical sound track). It is especially adapted to language work, for it allows adaptation of films when a different sound track is put on the magnetic stripe.

Required specifications:

1. See: motion picture projector, required specifications.
2. A long microphone cord must be provided to isolate the narrator from the projector noise.

Optional characteristics:

1. These projectors are more expensive but should be carefully considered for possible use in foreign language teaching.
2. Adapter kits for some sound projectors are available which permit use of films with a previously recorded magnetic strips.
3. Although the frequency response of magnetic stripe is inferior to regular recorded tape, it is still superior to the optical track.

C. Opaque Projector

Function: To project reflected images of opaque materials (pages from a book, magazines, sample articles, realia) on a screen. The brilliance of the image is much less than that of other types of projection. These units require a high degree of light control in the locations in which they are used.

Required specifications:

1. The projection stage must accommodate a 10" x 10" area.

2. The projector lamp must be at least 1,000 watts.
3. The blower and cooling system must be quiet in operation.
4. The cooling system must be adequate to keep the machine cool to the touch and prevent overheating of specimens and inserts.
5. The airflow must be directed against the projection stage to permit insertion of unmounted sheets of paper.
6. A heat condensing (protecting) glass slide insert must be provided.
7. The "on-off" switch must be of the noiseless type.
8. Mirror adjustment screws must be readily accessible.
9. Focusing arrangements must be simple to operate.
10. There must be convenient access ports for replacing lamps and cleaning mirrors.
11. The projector must operate on 110-120 volt, 50-60 cycle AC.
12. All controls and functions must be clearly and permanently marked.
13. Instructions must be furnished.
14. The power cord must have a 3-wire, polarized plug; an adapter may have to be furnished.

D. Overhead Projector

Function: to project on a screen above and behind the teacher enlarged images of notes, diagrams or drawing which he makes, or of slides and filmstrips.

Required specifications:

1. Size of projection stage, ranging from 3" x 4" to 10" x 10", must be specified according to intended use.
2. A pre-focus lamp must be furnished to produce a clear image in a normally lighted room.
3. The projector must be blower cooled.
4. The projection lens must have focusing and vertical tilt adjustment.
5. It must produce an image ranging from about 4 x 4 feet for a 6-ft. projection distance to about 9 x 9 feet for a 14-ft. projection distance.
6. The projector must operate on 110-120 volt, 50-60 cycle AC.
7. All controls and functions must be clearly and permanently marked.
8. Instructions must be furnished.
9. The power cord must have a 3-wire, polarized plug; and adapter may have to be furnished.

Optional characteristics:

1. Accessories for projection of 3¼" x 4" or 2" x 2" slides and filmstrips are available.
2. Removable rolls of cellophane which may be rolled forward are available with certain projectors and are recommended.

E. Projection Screens

Function: to project images in laboratories and classrooms originating from motion picture, opaque, overhead and slide projectors.

Required specifications:

1. The screen must be fireproof, fungus and mildew proof and washable.

2. The size of the screen must be selected in accordance with the size of the room, number of individuals to be accommodated, and the focal length of the projection instrument to be used. Manufacturers projection charts are available and should be consulted.
3. Screen surfaces must be selected in accordance with the viewing angle, intensity of projected light and light control in the room.

Optional characteristics:

Screen surfaces

1. Matte screen: Its surface is white, smooth and without grain. It does not reflect as much light as a beaded or silvered screen, but does reflect light with a stronger intensity at wide viewing angles. It is particularly useful for microprojection and for classrooms that are broad but shallow. It also reproduces natural colors better than any other type of screen.
2. Glass-beaded screen: It reflects much more light than a matte screen but the viewing angle is restricted to 25 or 30 degrees. There is a very high drop in illumination beyond 30 degrees. However, the high illumination gained in the better viewing positions affects the poor darkening conditions found in many classrooms.
3. Silverized or aluminized screen: This screen is not so highly reflective as glass-beaded screens, but is more reflective than matte screens. The viewing angle is not so sharply delimited as with glass-bead screens. Silverized screens are particularly effective for three-dimensional projections because of the polarizing effect this surface has on light.
4. Lenticular screen: This recently developed screen is particularly adapted to viewing situations where light control is not sufficiently effective to permit the use of more conventional screen types. The surface has a 'corrugated' appearance and is coated with pigmented or reflective materials. It is available in all standard sizes but generally with tripod mounting only.

F. Projection Screen Mountings

Function: to mount or fasten projection screens.

Required specifications:

1. Spring roller, permanent wall or ceiling mounting:
   a. A dust cover and complete enclosure must be provided.
   b. Provision must be made to prevent screen from being pulled away from roller.
   c. Mounting hardware for safe attachment to supporting surface must be provided.
   d. Chains or cables must not be used.
2. Electrically operated permanent wall or ceiling mounting:
   a. Screen housing must include dust proof cover.
   b. Electrical system must have limit cutoff for lowering or raising screen.
   c. Manual control must permit stopping screen at any desired intermediate position.
   d. Electrical system must meet local code requirements.
   e. Screen motor must operate on 110-120 volt, 50-60 cycle current.

3. Tripod stand, mobile for use in different locations:
   a. Assembly must provide locking devices to prevent parts from opening while being moved.
   b. Sufficient extension of upright must be provided to raise top of screen to height permitting full view by all students.
   c. Locking devices and adjustments must be simple to operate.
   d. Mechanical arrangements must protect screen while being moved.
   e. Provision must be made to prevent screen from being pulled away from roller.

G. Slide and Filmstrip Projector
Function: to project slides or filmstrips in laboratories and classrooms. It may be manual or automatic.
Required specifications:
1. It must accommodate standard single frame filmstrips or 2" x 2" slides.
2. It must be equipped with a lamp of at least 500 watts and a condenser system capable of yielding a brilliant image filling the screen to be used.
3. The housing must be blower cooled and the cooling system must be effective enough to prevent slides or film frames from being burned.
4. It must have coated optics.
5. The objective must have a focal length and aperture suited to the room in which projector is to be used.
6. A carrying case must be provided.
7. The case and housing must be sturdy to prevent damage.
8. All controls must be clearly and permanently marked.
9. The power cord must have a 3-wire, polarized plug; an adapter may have to be furnished.
10. Instructions must be furnished.
22. The unit must operate on 110-120 volts, 50-60 cycle AC.

Optional characteristics:
1. A semi-automatic changer adapter for manual slide projectors is available and recommended.
2. Units which synchronize a tape recorder with a slide projector for illustrated recorded exercises are available.

GENERAL ACCESSORIES SPECIFICATIONS

A. Cabinets and Storage Shelves
Function: Units to be used in foreign language classrooms or laboratories for storage of equipment or materials. Design, size and materials must be related directly to intended use and needs.

B. Carts and Stands
Function: to store, position, or transport equipment and materials. For use in foreign language classrooms or laboratories.
Optional characteristics:
1. Units may be of wood or metal construction.

2. All edges should be smoothed, flanged, or rolled to protect personnel and equipment.
3. Thickness or gauge of shelves and supporting uprights should be sufficient to carry a safety margin of overload.
4. Spot welded joints are recommended. Tubular construction requires special fastening.
5. Units should be cleaned, primed, and finished to prevent abrasion, shipping or cracking.
6. Wheels should have a minimum diameter of 4" and should be of rubber or composition material.
7. Two wheels should be rigidly fastened and two wheels should be caster-mounted.
8. Units used for electrically operated equipment should include 110-120 volt, 50-60 cycle AC convenience outlets. A substantial connecting cord, including grounding wire, should also be provided.
9. Receptacle or reel to wind up the power cord should be provided.
10. Doors or covers should be attached with multiple or piano hinges. Fasteners or catches should be provided.
11. Projection carts should be approximately 45" high with a tilting top which is at least 32"x16" in size. A mat for the top should be provided to prevent projectors from slipping in the cart if tilted.

C. Darkening Facilities (Draperies, Opaque Shades, Blinds)
Function: to darken rooms for projection purposes.
Requires specifications:
1. Materials must be fireproof or flame resistant and must meet the requirements of the local fire code.
2. Material used must effectively darken room for anticipated projection conditions.
3. Accessories for hanging must be of substantial materials and designed to give continuous service.
4. In electronic classrooms and laboratories, draperies with sound absorbing qualities must be used.

Optional characteristics:
1. Installation should provide for adequate ventilation.
2. Complete darkness should be avoided by using high-powered (1,000 watt or more) projection equipment.
3. Venetian blinds, fiberglass and other materials which do not absorb sound should not be used in laboratories.

D. Felt or Flannel Board
Function: to affix illustrations for the current lesson.
Required specifications:
1. Board must have a flat, non-warping backing.
2. Size must be proportionate to viewing in standard classroom.

Optional characteristics:
1. Flannel is preferable to flocking.

E. Map Mounting
Function: to mount or fasten maps in a classroom or laboratory.
Required specifications:
1. For permanent wall mounting:
   a. maps must be mounted on spring roller.
   b. a dustproof cover or complete enclosure must be provided.
   c. provision must be made to prevent map from being pulled away from roller.

d. mounting hardware for safe attachment to supporting wall must be provided.

2. For portable mounting:
   a. a tripod stand must be provided.
   b. maps must be provided with charthead.

Optional characteristics:

1. Several maps may be mounted in a single dustproof case.
2. Several maps may be mounted on a single spring roller.
3. Several maps may be inserted in the same charthead.
4. Backboards may be of wood or metal.

LANGUAGE TEACHING MATERIALS

GENERAL CONSIDERATIONS

A. Determination of the intended use
As with equipment, materials must be suited to the instructional program. Materials are essentially teaching tools designed to implement the stated objectives and to enhance the methods and techniques employed. Some of the considerations for selection are:

1. use as basic material
2. use as supplementary material
3. entire class use
4. laboratory use
5. individual student use
6. use for demonstration
7. use for illustration
8. continuous use
9. occasional use

B. Integration with the instructional program
After the overall needs have been determined, materials should be analyzed in terms of their appropriateness to the particular language program. Among the factors to be considered are:

1. are the materials prepared for the age and interest levels of the student?
2. are the materials prepared for the year or level of foreign instruction at which they will be used?
3. are the materials designed for the method and approach used in the program?
4. are the materials acceptable in their actual form?
5. do the materials need a greater or lesser degree of adaptation?
6. do the materials reach and stay at a given plateau?
7. do the materials provide for linguistic progression?
8. do the materials provide for the appropriate rate of progression?
9. are the materials--particularly audio-visual materials--of good quality?
10. are the materials available in adequate quantities?
11. do the materials provide for individual student needs?

TYPES OF MATERIALS WHICH MAY BE ACQUIRED

Rules and regulations set up by the U. S. Office of Education for the administration of Title III restrict materials to those items which can be used directly in the teaching process.

A. Books
For supplementary or source use; must be in the modern foreign language.

B. Charts
Word or phrase charts must be in the modern foreign language. Picture charts must have captions in the modern foreign language or be without captions.

C. Dictionaries
Must be bi-lingual or be in the modern foreign language.

D. Encyclopedias
Single- or multi-volume encyclopedias may be included. They must be in the modern foreign language.

E. Films, Motion Picture
Sound films must have narration in the foreign language; silent films must have captions in the foreign language or be without captions. Districts should consider the addition of a magnetic stripe to film so that, with a magnetic projector, the teachers can adapt foreign language text to the film.

F. Filmstrips
Sound filmstrips must be in the modern foreign language; silent filmstrips must have captions in the modern foreign language or be without captions.

G. Foreign Language Magazines

H. Foreign Language Newspapers

I. Flashcards

J. Magnetic Tapes
1. Pre-recorded tapes must be in the modern foreign language.
2. Blank tapes for recording purposes.

K. Maps
Must have foreign language text.

L. Pamphlets
Text must be in the modern foreign language.

M. Pictures

N. Realia
May include costumes, games, posters, models, art objects, and the like; items requested must be justified in relation to the program.

O. Records and Transcriptions
1. Pre-recorded: must be in the modern foreign language.
2. Blank: for recording purposes.

P. Slides
If captions are included on slides, they must be in the modern foreign language.

Q. Slide Mountings
Must meet normal standards for use in manual or automatic projectors or viewers.

R. Song Books
Must have song text in the modern foreign language.

S. Other similar items may be included which are used in the classroom or laboratory instruction by teachers or students or which extend classroom or laboratory experiences for the program planned.

MINOR REMODELING

The necessity for remodeling must be demonstrated on the basis of the planned program for improvement of instruction. It may apply only to existing buildings, space or facilities, and must be accompanied by detailed plans, sketches and other descriptive materials. A breakdown of costs (with copies of bids) of labor and materials must be submitted with the request.

Provision should be made to permit flexibility in the use of the space or facilities for various groups and various activities.

Any remodeling must comply with all local and state building, fire and safety codes and regulations.

Minor remodeling for foreign language may include:

1. Wiring or re-wiring within the room for electronic equipment installation;
2. Soundproofing of rooms or recording booths (isolation);
3. Partitioning of existing space; or removal of partitions;
4. Installation of room darkening materials (unless new projection equipment is requested which is of the high intensity--750 to 1200 watt bulbs--to make extensive darkening unnecessary);
5. Construction of storage facilities.